

THE *CLEMATIS VIRGINIANA* (RANUNCULACEAE) COMPLEX IN THE SOUTHEASTERN UNITED STATES

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ABSTRACT

The *Clematis virginiana* complex of eastern North America consists of two closely related and often confused species. The morphological, phenological, ecological and geographical characterization of these two species is clarified here, accompanied by notes on typification, nomenclature and synonymy. *Clematis catesbyana* Pursh is distinguished from the more widespread *C. virginiana* L. on the basis of leaves 5-foliolate to biternate as opposed to 3-foliolate, and carpels 18–35 as opposed to 40–60. *Clematis catesbyana* also flowers earlier in the season than *C. virginiana* and occupies drier habitats. *Clematis catesbyana* is restricted to several disjunct regions of the southeastern United States, while *C. virginiana* is widespread throughout eastern North America.

The Virgin's Bower of eastern North America consists of two closely related species that are often confused. Both are rampant vines that produce a profusion of small white flowers in the summer (fig. 1), followed by heads of long-tailed achenes in the fall (fig. 2). *Clematis virginiana* was described by Linnaeus in 1755 from a specimen probably collected in Pennsylvania (Essig & Jarvis 1989), and is common throughout much of eastern North America, from Quebec to Florida and westward to eastern Texas and Manitoba. *Clematis catesbyana* was described by Frederick Pursh in 1814, from a specimen collected by Mark Catesby in South Carolina in 1722 (fig. 3). According to Pursh, it differed from *C. virginiana* primarily in having biternate leaves with typically 3-lobed leaflets rather than ternate leaves with coarsely toothed leaflets (fig. 4). Specimens matching the description of *C. catesbyana* have subsequently been found in scattered areas throughout the southeastern U.S., from Virginia to Florida, and westward to Louisiana, Oklahoma and Kansas (fig. 5).

Since Pursh, authors have differed on whether *C. catesbyana* is truly distinct from *C. virginiana*. The flowers of the two species are essentially identical in appearance, and it has not previously been clear whether the described vegetative differences correlated with geographically or ecologically distinct taxa, or were merely forms of one variable taxon. DeCandolle (1817, 1824) recognized both species, while Torrey and Gray



FIG. 1. Flowers of *Clematis catesbyana* from central Florida.



FIG. 2. *Clematis catesbyana* from northwestern Florida, in fruit.

(1838–1840) treated *C. catesbyana* as a synonym of *C. virginiana*. Kuntze (1885), employing an extremely broad species concept, included both *C. virginiana* and *C. catesbyana* as subspecies under *Clematis dioica* (which was technically incorrect because the epithet *virginiana* has priority over *dioica*). Gray (1895) recognized both species, essentially on Pursh's criteria. Small (1933) also recognized both species, and described an additional species in the complex, *C. micrantha*, which supposedly had smaller flowers.

Recent floristic authors have generally recognized one or the other species, without attempting to differentiate the two, implying usually that *C. catesbyana* represents only a morphological variant of *C. virginiana*. Steyermark (1963), Radford et al. (1968), and Wunderlin (1982) recognized only *C. virginiana*, with the latter two authors citing *C. catesbyana* as a synonym. Clewell (1985), on the other hand, recognized *C. catesbyana* as the species occurring in the Florida panhandle, but did not take into consideration specimens matching *C. virginiana* that occur there. He therefore did not deal with the differentiation of the two species. Keener (1975) and Keener & Dennis (1982), in the broader context of studies of the Ranunculaceae of the southeastern United States, recognized *C. virginiana* and *C. catesbyana*, but placed Small's *C. micrantha* in synonymy under the latter. Keener's (1975) study is the only recent work that attempts to differentiate between the two species, and provides some tentative morphological criteria for separating them.

The present investigation, part of a long-term study of *Clematis* section *Clematis* (sensu Tamura 1968) worldwide, was undertaken to clarify the status of *Clematis catesbyana* relative to *C. virginiana*, and perhaps to achieve a better understanding of specific differences within the section as a whole. Throughout the section there are difficult complexes of species, and the differences between species seem at times to be minor and insignificant. Experience with this well-known complex from North America should therefore help illuminate other complexes.

MATERIALS AND METHODS

Specimens of the *Clematis virginiana* complex were borrowed from major herbaria throughout the eastern U.S. (A/GH, AUA, DUKE, FLAS, FSU, GA, KANU, LSU, MO, NCU, NO, NY, OKLA, PH, SMU, TENN, TEX, UARK, UNA, US, USCH, and USF). Data from herbarium sheets were entered into a computerized database using Asksam, a text-oriented database system that allows variable length fields. Label data, reproductive status, and various morphological characters were recorded. Specimens were initially sorted according to leaf character (leaflets 3 vs leaflets 5 or more), following Pursh and Keener. The database was then analyzed for



FIG. 3. Holotype (OXF) of *Clematis catesbyana*, collected by Mark Catesby in South Carolina.

correlations between morphological, ecological, phenological and geographical parameters.

RESULTS

Comparative study of about 750 sheets of the *Clematis virginiana* complex in the southeastern U.S. revealed a strong correlation between the leaf characters described by Pursh and several previously unrecognized morphological, phenological, and ecological features, as well as with geographic distribution.

Morphology: achene number

Plants with leaves 5-foliolate to biternate (*C. catesbyana*) consistently possess fewer than 35 carpels per flower (mostly 20–25), while plants with ternate leaves (*C. virginiana*) consistently have more than 40 carpels per flower (mostly 45–55). This is roughly twice as many carpels per flower in *C. virginiana* as in *C. catesbyana*, giving the achene heads of the former a fuller, more globose appearance than the heads of *C. catesbyana* (fig. 6).

A related character, achene color, was used by Keener (1975) to distinguish between the two species. According to him, *C. virginiana* has achenes "light to dark-brown or greenish brown," while *C. catesbyana* has achenes "reddish or purplish brown to dark blackish-purple." This seems to be valid to a degree, but is not as clear-cut or reliable as achene number. Achene color in dried specimens varies considerably depending on ripeness and drying conditions. I found a number of specimens that could not be properly placed on the basis of this character.

Phenology

A measure of the flowering phenology of each species was obtained by treating individual specimens as data points. It was found that the two species respond differently to seasonal cues (fig. 7), with *C. catesbyana* flowering early in the season (early July to early August) and *C. virginiana* flowering later (early August to late September in the southeast). The data were plotted against latitude because, as one moves southward, flowering is progressively later in the season. Thus, within particular latitudinal belts there is little overlap in blooming period. In central Florida, for example, where natural populations and cultivated plants have been observed for several years, flowering periods of the two species are consistently separated by 2–3 weeks. Where there does appear to be some overlap, it is between specimens that are geographically remote from one another. Thus it appears that the opportunity for hybridization between the two species is

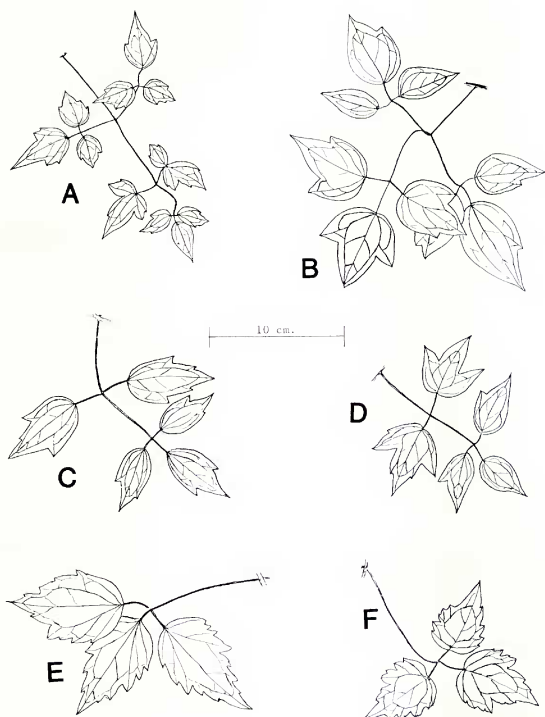


FIG. 4. Representative leaves of *Clematis catesbyana* (A–D) and *C. virginiana* (E–F).

extremely limited, if it exists at all. The Atlantic coastal populations of *Clematis catesbyana* (see fig. 5) were not included in figure 6, because the latitudinal effect is offset, possibly because of the longer growing season along the coast. In North Carolina, for example, coastal populations flower from late July to early September, a full month later than inland populations at the same latitude, and even a little later than the Florida populations. The question of hybridization with *C. virginiana* does not arise here, since these populations are geographically quite isolated.

Ecology and Geography

Both species are weedy, rampant vines inhabiting disturbed sites. *Clematis virginiana*, however, is confined to river margins and other habitats with damp to saturated soil, while *Clematis catesbyana* tends to occur on drier, well-drained, often calcareous sites. The latter has major populations on the Ozark Plateau, the Nashville Dome region of central Tennessee, loess bluffs along the Mississippi, Apalachicola, and Chattahoochee rivers, on shell mounds and sand dunes along the Atlantic coast, and in forested regions, often over exposed limestone, in west-central Florida (fig. 5). A few isolated populations in the Appalachians are associated with limestone outcrops. Both species are peculiarly lacking from the coastal plain of the Carolinas and Georgia, except for the narrow coastal population of *C. catesbyana* that extends from North Carolina to northeastern Florida. Although *C. catesbyana* is more often cited from calcareous habitats, habitat selection appears to be primarily for topography and drainage, rather than soil types or pH. Both taxa can sometimes be found over limestone substrates as well as on soils of more acid reaction, and thrive equally well when cultivated in rich, slightly acid soil.

A great many recent specimens of both species were collected along roadsides and other man-made habitats. Thus it is possible that some isolated populations have been spread beyond their natural range by humans in recent times. A large population of *C. virginiana*, for example, occurs in central Florida, in land disturbed by phosphate mining and along road sides. It most likely was introduced here recently, for it was not collected until 1976. This despite the fact that the population is traversed by State Highway 60, which had been travelled by a number of earlier botanists. When blooming and fruiting, the plants are very conspicuous along the road. Plants, apparently from this population, have now spread northward along Interstate 75, in low, wet roadside depressions into southern Pasco County. *Clematis catesbyana*, on the other hand, is apparently moving southward along the same highway in higher and drier spots, from natural populations in Hernando County into northern Pasco County.

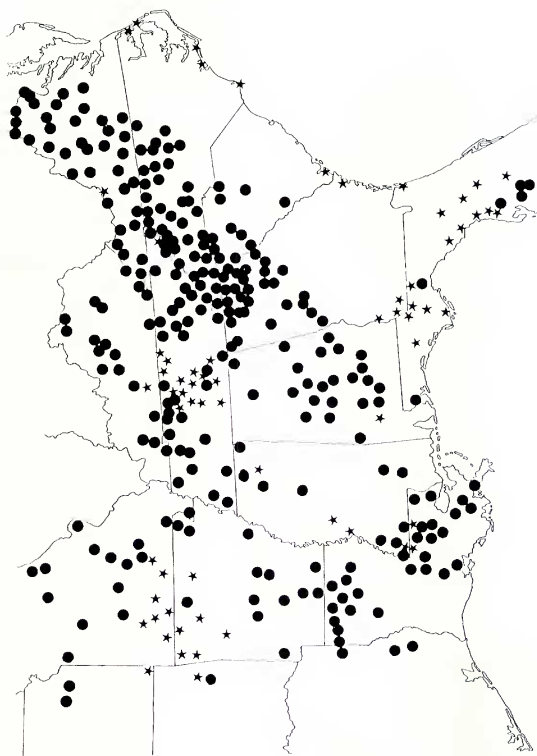


FIG. 5. Distribution of *Clematis catesbyana* (stars) and *C. virginiana* (dots) in the southeastern United States.

DISCUSSION AND CONCLUSIONS

Extensive analysis of herbarium material of *Clematis catesbyana* and *C. virginiana* has shown that the two species differ significantly in morphology (carpel number, leaf dissection), in phenology, in geographical distribution, and in habitat preference. Living populations, and populations represented by complete herbarium material, can be readily identified by the criteria presented here. No clear evidence of hybridization or true intermediates has been seen. The combination of spatial and temporal separation of known populations, moreover, strongly suggests that the opportunity for hybridization is rare if it exists at all. This isolation, despite broadly overlapping geographical ranges, indicates that the speciation process between *Clematis catesbyana* and *C. virginiana* is essentially complete. The disjunct distribution and greater variation of *Clematis catesbyana* suggests that it may be the older of the two species. These are well-defined, natural taxa and their recognition as species, as done recently by Keener (1975), is fully justified.

TAXONOMIC TREATMENT

General description (*Clematis virginiana* complex): Woody, deciduous to evergreen, dioecious vines, climbing by means of tendrill-like petioles and petiolules. Leaves compound, thin, membranous, nearly glabrous above, coarsely toothed to entire, with sparse to dense short, simple, white hairs below; inflorescence of simple to compound, leafy to bracteate dichasia in the axils of leaves of current year's growth; axes hairy; flower buds ovoid (pistillate) or obovoid to pyriform (staminate), flowers white, sepals 6–14 mm long, 2–5 mm wide, linear-lanceolate to long-obovate; sparsely hairy above, more thickly so below, and densely hairy on margins, hairs fine, white; staminate flowers with ca. 30 to over 50 stamens, these somewhat shorter than the sepals, filaments flat, nearly as wide as the anthers, anthers ellipsoid, ca. 1 mm long, pistillodes rudimentary, inconspicuous, hidden in the thick hairs of the receptacle or often lacking altogether; pistillate flowers with numerous staminodes, similar to fertile stamens but shorter, sterile anthers rudimentary to nearly normal in appearance, lacking pollen; carpels numerous, ovary swollen, short-hairy, style elongate, nearly equaling the sepals, densely hirsute, stigma simple, curved-clavate; achenes lens-shaped, light to dark brown or reddish black, sometimes with a distinct, thickened, lighter rim, sparsely short-hairy, persistent style 2.5–3.5 cm long, covered with long, white hairs.

These species are adapted to the mesic conditions of eastern North America, and are distinguished most readily from related western species by their large and membranous leaves. *Clematis ligusticifolia* Nuttall, for



FIG. 6. Adhene heads of *Cleome catesbyana* (A) and *C. virginiana* (B).

example, differs in having slightly succulent or coriaceous, 5- to 7-pinnate leaves with stomata on both surfaces, and in other subtle characters (Keener 1975).

DIAGNOSTIC KEY TO *CLEMATIS CATESBYANA* AND *C. VIRGINIANA*

1. Mature vegetative leaves 5-foliolate to biternate, leaflets usually 3-lobed, few-toothed, petiole about 1/3 the length of the entire leaf; pistillate flowers with 18–35 carpels; flowering early July to mid-August; well-drained, often calcareous sites, southeastern U.S. *C. catesbyana*
1. Mature vegetative leaves ternate, leaflets usually coarsely dentate, petiole 1/2 the length of the entire leaf or more; pistillate flowers with 40–60 carpels; flowering July to August in the northeastern U.S., early August to late September in the southeastern U.S.; low, moist areas, riverbanks, roadside ditches, throughout eastern U.S. and Canada *C. virginiana*

CLEMATIS CATESBYANA Pursh, Fl. Amer. Sept. 2:736. 1814. — TYPE: SOUTH CAROLINA, *Catesby 1135* (HOLOTYPE: OXF photo!, see figure 3). *Clematis dioica* subsp. *catesbyana* var. *variabilis* Kuntze, Verh. Bot. Vereins Prov. Brandenburg 26:103. 1885, in part. *Clematis virginiana* var. *catesbyana* (Pursh) Britton in Britton and Brown, Ill. Fl. N. U.S. 2:67. 1897.

In the protologue to this name, Pursh cited a Catesby specimen in the Sherard Herbarium at Oxford ("v.s. herb Sherard"). A single specimen attributable to this species (fig. 3) has been located in the Sherard Herbarium. The specimen, numbered 1135, was collected by Catesby in Carolina in 1722 and matches Pursh's description well. It therefore can be considered the holotype.

CLEMATIS CORDATA Pursh, Fl. Amer. Sept. 2:384. 1814. — TYPE: WEST VIRGINIA, Summers Co.: on the ascent of Keeny's Knob, above the precipice called the Claypinch, *Pursh s.n. 1806* (LECTOTYPE, designated here: PH!). *Clematis dioica* subsp. *cordata* (Pursh) Kuntze, Verh. Bot. Vereins Brandenburg 26:103. 1885.

Clematis cordata was published at the same time as *C. catesbyana*, and has traditionally been treated as a synonym of *C. virginiana*. However, Pursh described the leaves as 5-foliolate, which suggests that it should properly be placed under *C. catesbyana*. Pursh indicated in the protologue only that he had seen living material of this species in the high mountains of Virginia. No type was designated. However, a Pursh specimen from the mountains of West Virginia (Keeny's Knob, Summers Co.), matching the type description, and most likely collected in 1806–07 (preceding the publication of the name in 1814), has been located at PH. It is designated here as the lectotype. Most of the leaflets have fallen off of the specimen, but from the elongated leaf rachis and the presence of scars, it is clear that the specimen was at least 5-foliolate. Similar material has been recently

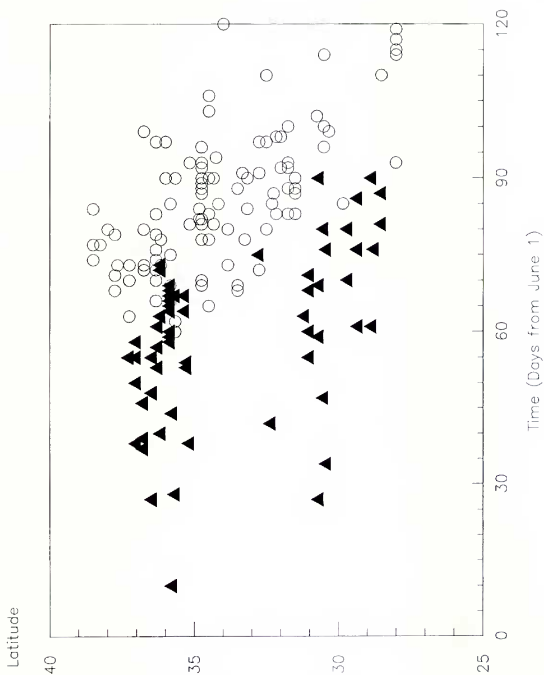


FIG. 7. Blooming time of *Clematis catesbyana* (solid triangles) and *C. virginiana* (circles).

collected from limestone outcrops in nearby Giles County, Virginia, which is clearly identifiable as *C. catesbyana*. There is no reason to consider *C. cordata* as a distinct taxon.

CLEMATIS MICRANTHA Small, Man. S.E. Fl., p. 525. 1933. — TYPE: FLORIDA. Hernando Co.: Choocochattee Hammock, S of Brooksville, *Small, Small & DeWinkler 10602* (LECTOTYPE, designated here: NY!; ISOTYPE: GH!).

In the appendix to his Manual (p. 1504), Small (1933) cites two specimens under this name as follows: "Type, Devil's Punchbowl, w. of Brooksville, Fla., Small, No. 11337; for fr. Choocochattee hammock, s. of Brooksville, Fla., Small, No. 10602, in herb N.Y.B.G". Of these two syntypes, only number 10602 is annotated by Small as the type, and this is the specimen that contains the small flowers (not fruit) that figure prominently in his description. Sheet number 11337 in fact is a sterile specimen. Therefore, I designate *Small et al. 10602* as lectotype of *Clematis micrantha*.

Clematis micrantha was defined on the basis of its smaller flowers. Flowers on the type are indeed unusually small, with sepals only 5 – 6.5 mm long. In the newly collected material from the type locality (Brooksville area, Hernando County, Florida), however, sepals range from 6.5 to 10.5 mm long, well within the range of *C. catesbyana* as a whole. Also according to Small, plants are closely fine-pubescent in *C. micrantha* and minutely pubescent or glabrate in *C. catesbyana*. I can see no difference when a wide range of material is examined. All specimens have fine, white hairs on stems and leaves that range from sparse to thick even on individual specimens. Small therefore based his species on a specimen that was evidently atypical of its population. The most distinctive feature of the Brooksville plants is the strong degree of leaf dissection. The leaves are biternate or even further divided into 11 or 15 small leaflets. This degree of dissection gradually diminishes northward, however, with leaves 5-foliolate to biternate in north Florida and mostly 5-foliolate in the Ozark region.

Representative specimens examined — CLEMATIS CATESBYANA: (complete list of exsiccate available from the author)

ALABAMA. Clark Co.: borders of woods in rich soil, 1859, *Denny 4* (UNA).

ARKANSAS. Benton Co.: Ozark Plateau, Boston Mtns., generally wooded area near Bella Vista, 5 mi N of Bentonville, elev. 1000 – 1200 ft, 22 Sep 1928, *Demaree s.n.* (UARK). Carroll Co.: Ozark Plateau, Province of White River Hills, wooded NE facing slope along White River at Catron Bend, 5 mi NW of Eureka Springs, elev. 900 – 1000 ft, Rockwood, 27 – 30 Jul 1953, *Leonard & May 6* (UARK). Cross Co.: Crowley's Ridge, Levesque, elev. 300 ft, 24 Jul 1939, *Demaree 19587* (MO). Izard Co.: along road from Croker to Guion near White River, 23 Jul 1970, *Thomas 20192* (FLAS, TENN). Logan Co.: Mt. Magazine, plateau surface at ca 2800 ft, 17 Sep 1967, *Tucker 6620* (NCU). Newton Co.: bank of Clark Creek and park entrance, occasional, 14 Jul 1974, *Thompson s.n.* (UARK). Washington Co.: in Fayetteville on Dickson St., in a ditch adjacent to the street on Mt. Sequoyah, 10 Jun 1975, *Davis 891* (UARK).

FLORIDA. Alachua Co.: Paynes Prairie State Preserve, S of Gainesville, N side of Alachua Sink, twining up trees, 23 Oct 1981, *Easterday 755* (FLAS). Citrus Co.: limestone outcrops, 3 mi SW of Pineola, 1 Aug 1948, *Ford 2295a* (TENN). Dixie Co.: S of Old Town, 11 Aug 1937, *West & Arnold s.n.* (FLAS); swamp at Suwanee, 5 Sep 1957, *Godfrey*

56042 (FSU). **Duval Co.:** Fort George Island, in delta of St. John's River, E of Jacksonville, abundant in roadside vegetation along E side of island, growing in crushed shell, 26 Nov 1987, *Essig 871126-1* (USF). **Franklin Co.:** Apalachicola, *Chapman s.n.* (MO). **Gadsden Co.:** near ground level, old wood stem 2.5 cm diam, at 6 m above ground 1.5 cm diam, shrouding crown of willow tree, borders of floodplain woodland, Apalachicola R., by US 90 bridge, Chattahoochee, 21 Sep 1981, *Godfrey 79145* (FLAS, FSU). **Hernando Co.:** abundant in old limestone quarry along CR 491, just N of jct. with US 98, 26 Sep 1986, *Essig 860926-1* (USF). **Jackson Co.:** climbing in trees along n-s paved rd. at Marianna Caverns State Park, 22 Jun 1960, *Mitchell 447* (FSU). **Lake Co.:** vic. Eustis Lake, 16-25 Aug 1894, *Nash 1731* (MO). **Leon Co.:** growing in roadside shrubbery along Hwy 90 at Sun Ray Rd., 1 Sep 1987, *Essig & Hansen 870901-1* (USF). **Levy Co.:** on roadside vegetation to 3 m high at Magnolia, 22 Sep 1959, *Cooley et al. 7182* (FSU, NCU, USF). **Liberty Co.:** floodplain woodland, Apalachicola R., E of Sneads, 16 Aug 1982, *Godfrey 79924* (FSU). **Marion Co.:** calcareous woodland near the Silver R., on Dupont property, 3 Oct 1984, *Godfrey 81651* (FSU). **Pasco Co.:** on fence beside I-75, W side, ca 0.25 mi S of CR 41, 27 Aug 1987, *Essig 870827-1* (USF). **Polk Co.:** at edge of swamp forest, dirt extension of Hinson Ave, near Lake Marion, E of Haines City, 4 Oct 1987, *Essig 871004-1* (USF).

GEORGIA. Decatur Co.: on edges of mixed woodland by the office of Resource Manager, Lake Seminole, 9 Sep 1979, *Godfrey 77204* (FSU, GA). **Early Co.:** bank of Chattahoochee R. at Sheffield's Landing, 14 Aug 1901, *Harper 1222* (MO). **Liberty Co.:** St. Catherine's Island, N end, edge of woods beside the housing compound, 24 Aug 1983, *Jones, et al. 23999* (GA). **Seminole Co.:** bank of Chattahoochee R. at Burler, 25 Jul 1947, *Thorne 5663* (GA).

KANSAS. Cherokee Co.: 6 mi E of Baxter Springs, near MO border, rocky wooded hillside, Ozark region, growing on thicket of *Cornus asperifolia*, 3 Jul 1948, *McGregor 1937* (KANU).

KENTUCKY. Warren Co.: along roadsides and ditches on Jenkins Rd. ca 1 mi south of U.S. Lock & Dam #1 on Barren R., ca 5 mi NNW of Bowling Green, 20 Jul 1970, *Nicely & Gough 3069* (NCU).

LOUISIANA. St. Helena Parish: abundant in open shrubby area ca 1 mi W of Chipola, assoc. with *Ilex* and *Cornus*, 30 Jul 1971, *Allen 1296* (DUKE, LSU). **West Feliciana Parish:** ca 1 mi from post office of Plettenberg, trailing on trees along logging road, 22 Aug 1938, *Correll & Correll 10467* (DUKE, LSU).

MISSOURI. Barry Co.: roadside, NE facing cherty slope, Hwy 112 east (T22N, R27W, W1/2, sec. 27), 16 Jul 1979, *Hornberger 532* (UARK). **Christian Co.:** Low thickets along east fork of Bull Creek, 3 mi SW of Chadwick, 8 Jul 1937, *Steyermark 23111* (MO); Rocky Hills, 28 Sep 1905, *Bush 3479* (MO). **Douglas Co.:** beside White R. and MO 14 at Twin Bridges, 28 Jul 1969, *Thomas 15817* (TENN). **Greene Co.:** 10 mi SE of Springfield, James River & MO Hwy 125, 25 Jul 1975, *Stalker & Nelson 478* (NCU). **Howell Co.:** rocky wooded slope bordering Indian Creek, 3.5 mi W of willow Springs, 18 Jul 1982, *Summers 1079* (MO). **Shannon Co.:** Montier, common, 29 Aug 1894, *Bush 1* (MO). **Stone Co.:** thickets along rocky creek, near Galena, 25 Sep 1923, *Palmer 23881* (MO). **Taney Co.:** common in woods, Swan, 4 Jun 1899, *Bush 99* (MO).

MISSISSIPPI. Union Co.: State Hwy 346, roadside 10 mi E of New Albany, 18 Jul 1966, *Temple 3504* (GA, NCU). **Warren Co.:** edge of wooded loessal bluffs facing delta region, 2 mi N of Redwood, 12 Jul 1955, *Ray 4910* (NCU). **Wilkinson Co.:** roadside, sandy soils, Smith Place, ca 5.5 mi WNW of Woodville, 22 Jul 1970, *Jones, Jones & Clark 19800* (NCU). **Yazoo Co.:** 6 mi SE of Yazoo City, loessial soil along creek, common, high-climbing, 29 Aug 1959, *McDaniel 1286* (UNA).

NORTH CAROLINA. Brunswick Co.: Smith's Island, Summer 1925, *Blomquist 3643*

(DUKE). Carteret Co.: very abundant as liana in low dense live oak-juniper forest on Shackleford Banks, 7 Aug 1962, *Anderson 386* (DUKE, FSU). Currituck Co.: thicket, 3 mi N of Waterlily, 31 Jul 1958, *Ables & Duke 48210* (NCU). Dare Co.: depression between dunes of Duck, 28 Aug 1952, *Radford 660* (NCU). Onslow Co.: Bear Island or Hammock Beach State Park at the western quarter of the island, abundant spreading sprawling vine forming dense cover on stabilized dunes at the western end of island, 25 Aug 1967, *Wilbur 9590* (DUKE).

OKLAHOMA. Cherokee Co.: open woods of creek valley, 22.1 mi NE of Tahlequah on State 10, 29 Jul 1951, *Wallis 860* (OKLA).

SOUTH CAROLINA. Beaufort Co.: very abundant in sunny disturbed areas and roadsides through abandoned fields, central Callawassie Island, 13 Oct 1981, *Aulbach-Smith 2036* (USCH).

TENNESSEE. Cannon Co.: in limestone valley, fencerow on Rt. 145, 3 mi N of Woodbury, 29 Jul 1958, *Ellis 249-E* (TENN). Carter Co.: on roadside in open place, toll rd. to Roan Mt. at 3800 ft, 26 Jul 1934, *Brown 100* (DUKE). Cheatham Co.: Ellis 196-E (TENN). Clay Co.: 1 mi N of Clay Co., line on Hwy 53, roadside, 7 Jul 1958, *Ellis 24736* (TENN). Coffee Co.: edge of woods, escarpment area, 28 Jun 1955, *DeSelm 593* (TENN). Davidson Co.: on fence by Mountain View Rd., N of Murphreesboro Rd., toward Percy, Priest Lake, 14 Aug 1968, *Kral 32340* (NCU). Giles Co.: NE of Pulaski, roadside on limestone, 13 Jul 1948, *Sharp et al. 9796* (TENN). Grundy Co.: borders of hardwood forest on mountain slope, 2.3 mi N of Monteagle, 24 Aug 1970, *Godfrey 69759* (FSU, NCU). Jackson Co.: 0.25 mi from Hwy 85 on Haydensville Rd., 7 Jul 1958, *Ellis 24409* (TENN). Macon Co.: bank of Long Cr., 9 Jul 1958, *Ellis 24457* (TENN). Maury Co.: on Green's Mill Rd., ca 1 mi from US 31, 27 Jul 1957, *Chappell s.n.* (TENN). Moore Co.: moist soil of slope SE of Lynchburg, 7 Aug 1947, *Sharp et al. 5685* (TENN). Rutherford Co.: growing over limestone on sides of road, between Rt. 231 and Christiana, 31 Jul 1958, *Ellis 326-E* (TENN). Williamson Co.: in limestone bottom, 1.5 mi SE of McDaniel, 6 Aug 1958, *Ellis 322-E* (TENN). Wilson Co.: limestone hillside 0.5 mi N of 70 N, on old roadbed of Hwy 109, 23 Jul 1958, *Ellis 24771* (TENN).

VIRGINIA. Giles Co.: 1.4 mi W of Mt. Lake Hotel on Va 613, 28 Jul 1965, *Scheer s.n.* (NCU).

CLEMATIS VIRGINIANA L., Cent. I Pl., p. 15. 1755. — TYPE: unnumbered specimen (LECTOTYPE: UPS, photo!), see Essig and Jarvis 1989. *Clematis dioica* subsp. *virginiana* (L.) Kuntze, Verh. Bot. Vereins Brandenburg 26:102. 1885. *Clematis virginiana* var. *genuina* Kuntze, Rev. Gen. 1:2. 1891, nom. inadmiss.

CLEMATIS CANADENSIS Miller, Gard. Dict. ed. 8, *Clematis* No. 5, 1768. — TYPE: not designated.

Miller described this species as having ternate leaves with cordate, toothed leaflets, which places it with *C. virginiana*. He cited "*Clematitidis canadensis* latifolia & triphylla. Sar.", most likely referring to the French Canadian botanist Michel Sarrazin, who collected in southern Quebec between 1697 and 1734. There may be a specimen matching the description at Paris.

CLEMATIS HOLOSERICEA Pursh, Fl. Amer. Sept. 2:384. 1814. — TYPE: "v.s. Herb. Walter."; not seen.

Pursh described this species as ternate, and holosericeous-pubescent, with small white flowers. The vestiture of the foliage is of no taxonomic consequence, and the species clearly falls under *C. virginiana*. Pursh cites a specimen in the Walter Herbarium (BM) from Carolina. Walter's specimens are mounted several to a page. Two specimens on page 34 of this collection, seen in a photograph only, possibly match Pursh's description. Most likely, one of these could be designated the lectotype, but I refrain from doing so until I have the opportunity to examine the specimens.

CLEMATIS MISSOURIENSIS Rydberg in Britton, Man. Fl. N. U.S. 1901, in part. — TYPE: *Webber s.n.* Sep 1886, Lincoln, Nebraska (LECTOTYPE, designated here: NY!). *Clematis virginiana* var. *missouriensis* (Rydberg) Palmer & Steyermark, Ann. Missouri Bot. Gard. 22:542. 1935. *Clematis virginiana* forma *missouriensis* (Rydberg) Fernald, Rhodora 39:309. 1937.

Rydberg mentioned only that the type came from Lincoln, Nebraska. The Webber specimen at NY is annotated as the type by an unknown hand. It is in fact the only known specimen, matching the description and coming from the type locality, that would have been available to Rydberg at New York at the time. Therefore, I designate this specimen as the lectotype.

The species was distinguished on the basis of the undersides of leaflets being densely hirsute, and the achenes lacking the characteristic thickened rim of *Clematis virginiana*. The achene character, cited most recently by Gleason and Cronquist (1963), was discounted by both Fernald (1937) and Steyermark (1963). The distinction disappears when many specimens are examined. Specimens with densely hirsute leaves are particularly common from western Missouri northward into Minnesota and Ontario, but can be found sporadically throughout the northeastern United States. Also, many specimens with hairy leaves from southwestern Missouri, cited as *Clematis virginiana* forma *missouriensis* by Steyermark (1963) actually belong to *Clematis catesbyana*. Formal recognition of this taxon at any level is thus likely to lead to confusion and therefore should be avoided.

Representative specimens examined — *Clematis virginiana*: (complete list of exsiccate available from the author).

ALABAMA. Clarke Co.: Oak-Pine woodland, 6 mi S of Thomasville School, 5 Sep 1970, *Kral 41126* (NY). Monroe Co.: Haines Island, high limestone ridge and ravines along the Alabama River, 3 Sep 1985, *Diamond 1742* (AUA).

ARKANSAS. Marion Co.: Buffalo Pt., ca 14 mi S of Yellville on Hwy 14 and off on Rd. 268, 6 Aug 1975, *Smith 219* (UARK). Saline Co.: 2 mi W of Benton, on gravel shores of

river, 6 Sep 1942, *Tolstead & Demaree* (NEB). Sevier Co.: 1 mi W of Lorksburg in small bottom, 20 Oct 1932, *Demaree* 9885 (MO, NY, US).

FLORIDA. Escambia Co.: near Molino, along W side of L&N RR tracks between Pretty Branch and its south fork, 9 Sep 1980, *Burkhalter* 7190 (FLAS, FSU). Hillsborough Co.: Edward Medard State Park, Turkey Cr. Rd., ca 5 mi S of Plant City, 25 Sep 1987, *Essig* 870925-5 (USF). Jefferson Co.: at and just within borders of hardwood hammock at Wacissa Spring, 6 Sep 1982, *Godfrey* 79947 (FLAS, FSU). Pasco Co.: in roadside vegetation, low, mesic areas along I-75, ca 3 mi S of Hwy 54, 20 Oct 1987, *Essig & Hansen* 871020-2 (USF). Polk Co.: growing in low moist area, along the N side of FL 630, ca 1.5 mi W of Fr Meade, 15 Oct 1977, *Shuey* 1998 (USF).

GEORGIA. Harris Co.: low, sunny roadside, rocky soil along GA 190 at Dowdell's Knob on Pine MtN, 25 Aug 1971, *Jones* 21361 (GA, NCU). Morgan Co.: Hard Labor Creek State Park, swampy area beside main highway, 24 Aug 1978, *Hill* 668 (GA, NCU). Walker Co.: Pigeon Mtn. Wildlife Management Area, NE of Harrisburg Gulf, 18 Aug 1981, *Coile et al.* 2285 (GA).

KANSAS. Douglas Co.: 2 mi E of Lecompton, Kansas River Bluff, growing over thicker, 20 Sep 1975, *McGregor* 28301 (KANU). Shawnee Co.: 1 mi E of Topeka, Kansas River Bluff, growing over thicker, 20 Sep 1975, *McGregor* 28306 (KANU).

KENTUCKY. Bracken Co.: rare, in weedy field at Meldahl Dam, ca 3 mi SE of Foster on Rt. 8, 24 Aug 1983, *Buddell* 2318 (NCU). Edmonson Co.: ca 1.5 mi NW of Pleasant Grove Church, Little Sally Branch, beside stream, 3 Aug 1968, *Elmore* 367 (NCU). McCreary Co.: Daniel Boone NE along Beaver Cr., 4.5 mi N of jct. Funston Ridge Plantation Rd. & Beaver Cr. Rd., 20 Aug 1972, *Broune & Broune* 72H28.2 (NCU). Todd Co.: roadside swamp in area of Guthrie clay, 0.5 mi from Guthrie, 8 Oct 1949, *Shanks et al.* 14335 (TENN).

LOUISIANA. Caddo Parish: common in open woods off Ellerbe Rd, 9 mi S of Shreveport, 17 Sep 1977, *MacRoberts & MacRoberts* 269 (NO). Oachita Parish: woods near Hogpen Rd, Lapine Rd., 3 mi S of LA 34, 10 Sep 1968, *Holler* 78 (NCU). Plaquemines Parish: margin of woods, Road C, eastern extension, 20 Sep 1978, *Fleming* 411 (NCU). West Feliciana Parish: roadside, 5 mi E of Tunica center on Rt. 66, 31 Oct 1976, *Paulson s.n.* (LSU). Washington Parish: on LA 483, 2.1 mi W of Warnerton, 29 Nov 1958, *Stone* 451 ().

MISSOURI. Butler Co.: swamps, 16 Oct 1905, *Bush* 3710 (MO). Dallas Co.: upper limestone thickets along Niangua R., 0.5 mi upstream from mouth of Douisenburg Cr., 5 Aug 1937, *Steyermark* 24261 (MO). Dent Co.: low thickets along N prong of Maramec R., between Stone Hill and Indian Trail State Park, 4 Aug 1936, *Steyermark* 12472 (MO). Jackson Co.: 5 Oct 1888, *Bush s.n.* (MO). Marion Co.: Bear Cr. Bluffs, Oakwood, 10 Aug 1916, *Davis* 1628 (MO).

MISSISSIPPI. Amite Co.: common along roadside and ditches, 15 mi N of Liberty, 20 Sep 1973, *Westbrook s.n.* (UARK). Forrest Co.: bottomland hardwoods along Leaf R. at McCallum, SE of Hattiesburg, 16 Sep 1966, *Jones et al.* 10463 (NCU). Jefferson Co.: weedy roadsides along US 61, 0.7 mi N of South Fork Coles Cr., 3.3 mi N of Stanton, 7 Sep 1980, *Pruski* 1893 (TEX); Laurel, disturbed woods along road between Reedy Cr. & Bogue Homo Cr., 1 Sep 1978, *Morgan* 1167 (FSU). Montgomery Co.: right-of-way and rich deciduous woods along LA Hwy 404, 0.9 mi W of Ava, 19 Aug 1967, *Temple* 6534 (GA). Tishomingo Co.: Hwy 72 at Yellow Cr., moist power line, 26 Sep 1974, *Coleman* 48426 (TENN). Wilkinson Co.: roadside, full sun, loess bluffs, ca 8 mi via air NW of Woodville on on Beaver Cr. Rd., between Lessley & Lanhart, 15 Sep 1970, *Jones et al.* 20143 (GA).

NORTH CAROLINA. Chatham Co.: seasonal stream bed, 1.2 mi E of NC 1008 on NC

1743, 31 Oct 1981, *Jones K-8* (NCU). Cherokee Co.: Bog, near Grape Ct., 6 mi NW of Murphy, 31 Aug 1956, *Radford 17625* (NCU). Granville Co.: creek bank, 3.2 mi S of Goshen, 28 Sep 1956, *Ables & Leisner 20118* (FLAS, NCU). Lincoln Co.: low pasture by Howard's Cr., 0.6 mi E of Cat Square, 10 Sep 1958, *Bell 15300* (NCU). Madison Co.: boggy pasture, 7.4 mi N of jct. with U.S 19 and 23 on 23, north of Mars Hill, 14 Jul 1958, *Ables & Duke 46326* (NCU).

OKLAHOMA. Cherokee Co.: open roadside of Illinois River Valley, 2.8 mi NE of Tahlequah on State 10, 30 Aug 1950, *Wallis 162* (OKLA).

SOUTH CAROLINA. Barnwell Co.: King Cr., Savannah R. Plant, 5 Oct 1953, *Kelley & Batson s.n.* (USCH). Lancaster Co.: deciduous forest, NE side of Flat Cr., 0.1–0.6 mi SE of CR 37, 2 Sep 1961, *Williamson & Ables 2001* (NCU). Richland Co.: rocky, open floodplain area along the Saluda River, under the I-126 overpass, 2 Oct 1976, *Aulbach 763* (USCH). Oconee Co.: N-facing wooded slopes of hill, 1.25 mi NW of Salem, 10.5 mi NE of Walhalla, 28 Aug 1950, *Duncan 11892* (GA). McCormick Co.: near Troy, 20 Aug 1921, *Davis s.n.* (MO).

TENNESSEE. Bedford Co.: calcareous banks, borders of wooded slope, 2.5 mi S of Shelbyville, 30 Aug 1958, *Godfrey 57528* (FSU). Carter Co.: deciduous forest, Round Bald Mtn., N slope, rocky spring below grass bald, 6 Aug 1956, *Ramsaur 1386* (NCU). Cheatham Co.: bank of Harpeth R. on Hwy 70, 15 Jul 1958, *Ellis 24366* (TENN). Clay Co.: jct. Hwy 53 & Dale Hollow Rd., N of Celina, 6 Jul 1958, *Ellis 24730* (TENN). Coffee Co.: Morton Lake, growing on trees and shrubs, 27 Nov 1980, *Terry 137* (AUA). Johnson Co.: edge of deciduous forest slope, bank of Watauga Lake on Hwy 67, S side of Butler, 3 Oct 1967, *Mahler & Mahler 4590* (NCU). Marion Co.: spray-zone slope at Foster Falls, Fiery Gizzard Gorges, 24 Aug 1964, *Clark 1201* (NCU). Obion Co.: Reelfoot (Lake) Wildlife Refuge Area, Walnut Log Division, Blue Basin, 18 Sep 1982, *Utch et al. 82-480* (NCU). Robertson Co.: roadside 3 mi W of Greenbrier, 24 Jun 1958, *Ellis 347-E* (TENN). Polk Co.: along RR S of Hiwassee R. at McFarlands in Cherokee NE, 3 Sep 1970, *Odenwelder & Bowers 45577* (TENN). Tipton Co.: beside gravel road at foot of Chickasaw Bluff No. 2, 1.3 mi N of jct. with Herring Hill & River Bluff RdS, 4 Oct 1968, *Warrington 406.3* (NCU). Union Co.: edge of corn field by river, Island-E, Norris Lake, 18 Sep 1934, *Kelley s.n.* (TENN).

TEXAS. Harrison Co.: edge of swamp forest, ca 3.5 mi NW of Karnack, 15 Sep 1964, *Correll 30155* (LL, NY). Jasper Co.: 1.5 mi NW of jct. US 190/63, on 63 at bridge crossing, SE side, 14 Oct 198x, *Cheatham s.n.* (TEX). San Augustine Co.: climbing on trees and shrubs, edge of swamp woods, ca 1 mi S of San Augustine, 14 Sep 1968, *Correll 36560* (FSU, LL).

VIRGINIA. Buchanan Co.: in Grundy, on VA 83, 18 May 1968, *James 9976* (NCU). Frederick Co.: 2.6 mi SE of jct. CR 615 & US 50, upland woods, 21 Jun 1968, *James 10844* (NCU). Giles Co.: jct. VA 604 and 110, along margin of Sinking Cr., weedy roadside & creek margin, 20 Sep 1975, *Rich 72* (GA). Henrico Co.: edge of marsh W of Elko Station, 3 Sep 1967, *Harvill 17369* (NCU). Lee Co.: edge of old field near Wilderness Rd. campground, elev. 1300 ft, 28 Aug 1974, *Hinckle 49612* (TENN). Prince William Co.: in shrubs on edge of swamp and on edge of open field of Marumsc Acres Lake Recreation Area, 8 Aug 1981, *Keyser 397* (FLAS).

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